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Attorney Docket: 060258-0281445
Amendment in Response to Non-Final OA mailed September 28, 2007

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all previous versions and listings of claims in this application.

Claim Listing:

1.   (Previously Presented) A data transmission method in a telecommunications system, comprising

transmitting data over a connection comprising a first leg supporting flow control on a lower transmission protocol level underlying a user level, an intermediate second leg not supporting flow control on the lower transmission level, and a third leg supporting flow control on the lower transmission protocol level, and

tunnelling lower level flow control information as in-channel signalling through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer.

2.   (Cancelled).

3.   (Previously Presented) The method as claimed in claim 1, wherein said second leg is an ATM connection, and said lower transmission protocol level includes an ATM adaptation layer.

4.   (Previously Presented) The method as claimed in claim 3, comprising encapsulating the flow control information in an ATM adaptation layer service data unit,

transporting the ATM adaptation layer service data unit to the other end of the second leg in accordance with an ATM network protocol,

extracting the flow control information from the ATM adaptation layer service data unit at said other end of the second leg.

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5.   (Previously Presented) A data transmission method in a telecommunications system, comprising

transmitting data over a connection comprising a first leg supporting flow control on a lower transmission protocol level underlying a user level, an intermediate second leg not supporting flow control on the lower transmission level, and a third leg supporting flow control on the lower transmission protocol level, wherein said second leg comprises an ATM connection, and said lower transmission protocol level includes an ATM adaptation layer,

tunnelling lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, said tunneling further comprising

encapsulating the flow control information in an ATM adaptation layer service data in one of the following ways:

inserting an octet carrying the flow control information before a first user data octet in a payload field of the ATM adaptation layer service data unit,

inserting a bit or bits carrying the flow control information before first user data bits in a payload field of the ATM adaptation layer service data unit,

inserting an octet or a bit or bits carrying the flow control information in the ATM adaptation layer service data unit as the only payload information in the payload field, or

inserting an octet or a bit or bits carrying the flow control information with a limited amount of user data in the payload of the ATM adaptation layer service data unit,

transporting the ATM adaptation layer service data unit to the other end of the second leg in accordance with an ATM network protocol, and

extracting the flow control information from the ATM adaptation layer service data unit at said other end of the second leg.

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6.   (Previously Presented) The method as claimed in claim 1, comprising said second leg being an ATM connection tunnelling said flow control information in ATM cells in an ATM layer through the ATM connection.

7.   (Previously Presented) A data transmission method in a telecommunications system, comprising

transmitting data over a connection comprising a first leg supporting flow control on a lower transmission protocol level underlying a user level, an intermediate second leg not supporting flow control on the lower transmission level, and a third leg supporting flow control on the lower transmission protocol level, wherein said second leg comprises an ATM connection, and said lower transmission protocol level includes an ATM adaptation layer, and

tunnelling said flow control information over the second leg in an out-of-traffic-channel signalling associated with a connection.

8.   (Previously Presented) A data transmission method in a telecommunications system, comprising

transmitting data over a connection comprising a first leg supporting flow control on a lower transmission protocol level underlying a user level, an intermediate second leg not supporting flow control on the lower transmission level, and a third leg supporting flow control on the lower transmission protocol level, wherein said second leg comprises an ATM connection, and said lower transmission protocol level includes an ATM adaptation layer,

tunnelling lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, said tunneling further comprising

recognizing at a first node between the first and second legs a need to start a flow control towards the second leg,

sending a flow control ON request over the second leg,

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receiving the flow control ON request at a second node between the second and third legs,

stopping sending new data or decreasing data rate from the second node to the first node over the second leg in response to the flow control ON request.

9.   (Previously Presented) The method as claimed in claim 8, wherein said step of tunnelling comprises further steps of

recognizing at the first node a need of stopping the flow control towards the second leg,

sending a flow control OFF request over the second leg,

receiving the flow control OFF request at the second node,

starting sending new data or increasing data rate from the second node to the first over the second leg in response to said flow control off request.

10.   (Previously Presented) A data transmission method in a telecommunications system, comprising

transmitting data over a connection comprising a first leg supporting flow control on a lower transmission protocol level underlying a user level, an intermediate second leg not supporting flow control on the lower transmission level, and a third leg supporting flow control on the lower transmission protocol level, wherein said second leg comprises an ATM connection, and said lower transmission protocol level includes an ATM adaptation layer,

tunnelling lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, said tunneling further comprising

recognizing at a first node between the first and second legs a need to start flow control towards the second leg,

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sending a flow control ON request over the second leg,

receiving the flow control ON request at a second node between the second and third legs,

activating in the second node flow control towards the third leg in response to the flow control ON request.

11.   (Previously Presented) A data transmission method in a telecommunications system, comprising

transmitting data over a connection comprising a first leg supporting flow control on a lower transmission protocol level underlying a user level, an intermediate second leg not supporting flow control on the lower transmission level, and a third leg supporting flow control on the lower transmission protocol level, wherein said second leg comprises an ATM connection, and said lower transmission protocol level includes an ATM adaptation layer,

tunnelling lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, said tunneling further comprising

recognizing at the first node a need of stopping the flow control towards the second leg,

sending a flow control OFF request over the second leg,

receiving the flow control OFF request at the second node,

deactivating in the second node flow control towards the third leg in response to the flow control ON request.

12.   (Previously Presented) A data transmission method in a telecommunications system, comprising

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transmitting data over a connection comprising a first leg supporting flow control on a lower transmission protocol level underlying a user level, an intermediate second leg not supporting flow control on the lower transmission level, and a third leg supporting flow control on the lower transmission protocol level, wherein said second leg comprises an ATM connection, and said lower transmission protocol level includes an ATM adaptation layer,

tunnelling lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, said tunneling further comprising recognizing the need for starting or stopping the flow being based on the status of a receiving or transmitting buffer in the first node or on incoming flow control information received over the first leg.

13.   (Cancelled).

14.   (Previously Presented) A telecommunications system, comprising

a first connection leg supporting flow control on a lower transmission protocol level underlying a user level,

an intermediate second connection leg not supporting flow control the lower transmission level,

a third connection leg supporting flow control on the lower transmission protocol level,

a first node between the first and second legs,

a second node between the second and third legs,

wherein the first and second nodes are arranged to tunnel lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, and wherein the first and second nodes are arranged to tunnel said flow control information in in-channel signalling over the second leg.

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Claims 15-17:   (Cancelled).

18.   (Previously Presented) A telecommunications system, comprising

a first connection leg supporting flow control on a lower transmission protocol level underlying a user level,

an intermediate second connection leg not supporting flow control the lower transmission level,

a third connection leg supporting flow control on the lower transmission protocol level,

a first node between the first and second legs,

a second node between the second and third legs,

wherein the first and second nodes are arranged to tunnel lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer., and wherein the first and second nodes are arranged to tunnel said flow control information in out-of-traffic-channel signalling over the second leg.

19.   (Previously Presented) A telecommunications system, comprising

a first connection leg supporting flow control on a lower transmission protocol level underlying a user level,

an intermediate second connection leg not supporting flow control on the lower transmission level,

a third connection leg supporting flow control on the lower transmission protocol level,

a first node between the first and second legs,

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a second node between the second and third legs,

wherein the first and second nodes are arranged to tunnel lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, and wherein the first and second nodes are arranged to recognize a need to start or stop flow control towards the second leg and to send a flow control ON request or a low control OFF request, respectively, over the second leg, and the first and second peer entities are responsive to receiving the flow control ON request or the flow control OFF request for stopping or starting, respectively, the sending, or decreasing and increasing data rate, respectively, of data towards the second leg.

20.   (Canceled.)

21.   (Previously Presented) A telecommunications system, comprising

a first connection leg supporting flow control on a lower transmission protocol level underlying a user level,

an intermediate second connection leg not supporting flow control the lower transmission level,

a third connection leg supporting flow control on the lower transmission protocol level,

a first node between the first and second legs,

a second node between the second and third legs,

wherein the first and second nodes are arranged to tunnel lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, and wherein the recognition of the need for starting or stopping the flow based on the status of a receiving or transmitting buffer in the nodes or on incoming flow control information received over the first or the third leg.

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22.   (Cancelled).

23.   (Previously Presented) A mobile communications system, comprising

a first connection leg supporting flow control on a lower transmission protocol level underlying a user level,

an intermediate second connection leg not supporting flow control the lower transmission level,

a third connection leg supporting flow control on the lower transmission protocol level,

a first network element of the mobile communications system between the first and second legs,

a second network element of the mobile communications system between the second and third legs,

wherein the first and second network elements are configured to tunnel lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, and wherein the first leg is at the air interface between a mobile station and one of said network elements.

24.   (Currently Amended) A ~~first~~ network element for a mobile communications system, the network element comprising:

a processor ~~the network element of the mobile communications system being~~ connected between a first connection leg and an intermediate second connection leg,

wherein the processor is configured to relay communication between ~~a~~ said first connection leg supporting flow control on a lower transmission protocol level underlying a user level on ~~a~~ said first connection leg, and ~~an~~ said intermediate second connection leg connected to a second network element of the mobile communications system relaying the communication

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further to and from a third connection leg supporting flow control on the lower transmission

protocol level, wherein the second leg does not support flow control on the lower transmission

level, ~~and wherein~~

wherein the ~~network element~~ processor is configured to tunnel lower level flow control

information through the lower transmission protocol level of the second leg between said first

and third legs in order to provide end-to-end flow control and thereby data integrity over the

connection on the lower transmission protocol layer, and ~~wherein~~

wherein the first leg is at ~~the~~ an air interface between a mobile station and the network

element~~one of said network elements~~.

25.   (Currently Amended) A network node for a telecommunications system, the

network node comprising:

~~the network node being~~ a processor connected between a first connection leg and an

intermediate second connection leg,

wherein the processor is configured to relay communication between ~~a~~ said first

connection leg supporting flow control on a lower transmission protocol level underlying a user

level ~~a~~ on said first connection leg, and ~~an~~ said intermediate second connection leg connected to

a second network node relaying the communication further to and from a third connection leg

supporting flow control on the lower transmission protocol level, wherein the second leg does

not support flow control on the lower transmission level, ~~and wherein~~

wherein the ~~first network node~~ processor is configured to tunnel lower level flow control

information through the lower transmission protocol level of the second leg between said first

and third legs in order to provide end-to-end flow control and thereby data integrity over the

connection on the lower transmission protocol layer, ~~wherein~~

wherein the ~~node~~ processor is configured to recognize a need to start or stop flow control

towards the second leg and to send a flow control ON request or a low control OFF request,

respectively, over the second leg, and the ~~node~~ processor is responsive to receiving a flow

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control ON request or a flow control OFF request for stopping or starting, respectively, the sending, or decreasing and increasing data rate, respectively, of data towards the second leg.

26.   (Currently Amended) A ~~first~~ network node for a telecommunications system, the network node ~~being~~ comprising:

a processor connected between a first connection leg and an intermediate second connection leg,

wherein the processor is configured to relay communication between ~~a~~ said first connection leg supporting flow control on a lower transmission protocol level underlying a user level ~~a~~ on said first connection leg, and ~~an~~ said intermediate second connection leg connected to a second network node relaying the communication further to and from a third connection leg supporting flow control on the lower transmission protocol level, wherein the second leg does not support flow control on the lower transmission level, ~~and wherein~~

wherein the ~~first network node~~ processor is configured to tunnel lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, and wherein the recognition of the need for starting or stopping the flow is based on the status of a receiving or transmitting buffer in ~~the~~ telecommunication system nodes or on incoming flow control information received over the first or the third leg.

27.   (Currently Amended) ~~Radio~~ A radio network controller for a mobile communications system, the controller comprising:

a processor connected between a first connection leg and an intermediate second connection leg,

wherein the ~~radio network controller being~~ processor is configured to relay communication between ~~a~~ said first connection leg supporting flow control on a lower transmission protocol level underlying a user level ~~a~~ on said first connection leg, and ~~an~~ said intermediate second connection leg connected to a second network element of the mobile

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communications system relaying the communication further to and from a third connection leg supporting flow control on the lower transmission protocol level, wherein the second leg does not support flow control on the lower transmission level, ~~and wherein~~

wherein the ~~radio network controller~~ processor is configured to tunnel lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer, and ~~wherein~~

wherein the first leg is at ~~the~~ an air interface between a mobile station and the radio network controller.

28.   (Currently Amended) A ~~first~~ network node for a telecommunications system, the network node comprising:

a processor connected between a first connection leg and an intermediate second connection leg,

wherein the ~~network node being~~ processor is configured to relay communication between a ~~said~~ first connection leg supporting flow control on a lower transmission protocol level underlying a user level on said ~~a~~ first connection leg, and ~~an~~ said intermediate second connection leg connected to a second network node relaying the communication further to and from a third connection leg supporting flow control on the lower transmission protocol level, wherein the second leg does not support flow control on the lower transmission level, ~~and wherein~~

wherein the ~~first network node~~ processor is configured to tunnel lower level flow control information as in-channel ~~signalling~~ signaling through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer.

29.   (Currently Amended) A ~~first~~ network node for a telecommunications system, the network node comprising:

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a processor connected between a first connection leg and an intermediate second connection leg,

wherein the ~~network node being~~ processor is configured to relay communication between a first connection leg supporting flow control on a lower transmission protocol level underlying a user level a first connection leg, and ~~an~~ said intermediate second connection leg connected to a second network node relaying the communication further to and from a third connection leg supporting flow control on the lower transmission protocol level, wherein the second leg does not support flow control on the lower transmission level, ~~and wherein~~

wherein the ~~first network node~~ processor is configured to tunnel lower level flow control information in an out-of-traffic-channel signalling associated with a connection through the lower transmission protocol level of the second leg between said first and third legs in order to provide end-to-end flow control and thereby data integrity over the connection on the lower transmission protocol layer.

30. (Currently Amended) A ~~first~~ network node for a telecommunications system, the network node comprising:

a processor connected between a first connection leg and an intermediate second connection leg,

wherein the ~~network node being~~ processor is configured to relay communication between a~~a~~ said first connection leg supporting flow control on a lower transmission protocol level underlying a user level a~~a~~ on said first connection leg, and ~~an~~ said intermediate second connection leg connected to a second network node relaying the communication further to and from a third connection leg supporting flow control on the lower transmission protocol level, wherein the second leg does not support flow control on the lower transmission level, ~~and wherein~~

wherein the ~~first network node~~ processor is configured to tunnel lower level flow control information through the lower transmission protocol level of the second leg between said first and third legs in one of the following alternative ways:

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inserting an octet carrying the flow control information before a first user data octet in a payload field of the ATM adaptation layer service data unit,

inserting a bit or bits carrying the flow control information before first user data bits in a payload field of the ATM adaptation layer service data unit,

inserting an octet or a bit or bits carrying the flow control information in the ATM adaptation layer service data unit as the only payload information in the payload field, or

inserting an octet or a bit or bits carrying the flow control information with a limited amount of user data in the payload of the ATM adaptation layer service data unit.